

4.0 DAM INSPECTOR RESPONSIBILITIES

4.1 EXPERIENCE AND TRAINING

The required expertise of the inspector or inspection team depends on the type of inspection being performed, the type of dam, and the site conditions. The inspection personnel should be familiar with dam design and construction, the causes of dam failures, and the visual signs which identify problems or potential concerns. It is recommended that inspectors have formal training on dam inspection techniques. Table 4-1 lists some guidelines for the qualifications of the inspector or inspection team.

Inspection teams for a formal technical inspection should include a registered professional engineer, experienced in dams, as the lead inspector. The lead inspector should have knowledge with soil and soil construction, hydrology, hydraulics, dam design and construction, and dam safety inspection methods. The inspection team size and member expertise will vary depending upon the type of dam, and the condition of the dam or types of problems that may be present. A formal technical inspection of a dam and its

appurtenances requires study, investigation, and analyses of many diverse, individual subjects and conditions, together with evaluations of their interrelationships. Accordingly, this kind of inspection requires skilled specialists with expertise that is pertinent to the dam conditions, and individuals with the broadest possible experience in all phases of dam design and construction engineering for overall review. Inspecting personnel may include individuals who are civil engineers, geotechnical or mining engineers, hydrologists, geologists, structural engineers, engineering technicians, dam operators or tenders, and other specialists, depending on the components of the dam to be inspected. The lead inspector may perform the visual inspection alone if he/she has a broad-based, educational and technical experience with dams and if the dam does not have complex features or severe problems. On larger, complex dams it is likely that no one individual will have all the necessary expertise that is required, and an inspection team will be needed. Larger organizations may be fortunate enough to have staff that includes mechanical engineers, hydrologists, electrical engineers, geotechnical engineers, and other specialists available to evaluate specific features of a dam.

Inspecting personnel, regardless of their field of expertise, need to have knowledge in the design, analysis, construction, and operation of dams. The dam owner or his

Table 4-1
Recommended Inspection Team

Formal Technical Inspection

- Lead Inspector - registered professional engineer with dam experience
- Assistant Inspector(s) - other dam safety professionals as needed based on type of dam and appurtenant works
- Dam Owner or representative

Maintenance Inspection

- Dam Maintenance Personnel - may be accompanied by a qualified dam safety professional

Informal Inspection

- Dam Owner or Maintenance Personnel

Special Inspection

- Dam Owner or Maintenance Personnel - should be accompanied by engineer or other professional

Note: Assistant Inspectors should be professional engineers or geologists with expertise in the materials or area of investigation; e.g. a geologist would be required for complex geological foundation conditions.

representative should always be present during a formal technical inspection to learn as much as possible about the dam and potential problems.

A maintenance inspection is typically performed by the person(s) assigned responsibility for the operation or maintenance of the dam and its appurtenant works. This person is often referred to as the dam operator or dam tender. The person assigned this responsibility should be familiar with the dam and should possess sufficient knowledge to make accurate assessment of the dam's condition. An engineer or other qualified dam safety professional may accompany the dam operator or tender during a maintenance inspection, but generally does not.

The dam owner, dam operator, or dam tender typically performs informal inspections and special inspections. Again, an engineer or other qualified dam safety professional may be required to assist in a special inspection depending on the specific situation.

There may be times when specialists must apply scientific and engineering knowledge and experience to a wide range of tasks during a dam inspection. These tasks may include interpretation of the geologic structure of dam sites, appraising the engineering properties of the foundation and embankment, predicting and analyzing seepage, calculating and analyzing stresses and stability of embankments and appurtenant structures, evaluating the runoff from watersheds, estimating the capacity and flow in spillways and



Figure 4-1 The inspector evaluating this dam must be familiar with concrete, modes of deterioration, and repair methods.

outfalls, evaluating the mechanical and electrical equipment if present, and analyzing instrumentation and other monitoring data. The proper performance of these tasks usually requires qualified individuals such as civil engineers, soils or geotechnical engineers, engineering geologists, structural engineers, hydraulic engineers, and hydrologists. Occasionally there may be a need for the services of a mechanical engineer, an electrical engineer, or a seismologist. The assistance of engineering and geological technicians, surveyors, and laboratory technicians may also be required.

Highly specialized services may also be required for some dams. These services may include underwater visual inspections, televised conduit inspections, or geophysical investigations. These services are readily available through specialized firms and will usually require advance notification and contractual arrangements. Televised conduit inspection may be required when conduit diameters are small or when direct access is not possible or feasible. Drilling or other geophysical services may be required if additional subsurface information is needed. If drilling is required, more often than not soils laboratory services will be required to determine the engineering parameters of the soil samples obtained during drilling. Only firms with experience pertaining to the

specific materials at the site should be selected.

Finally, the prepared inspector or inspection team needs to have a thorough knowledge of the dam's history so that they can put what they see into perspective. A review of applicable project records improves the inspector's ability to evaluate observed conditions while on the site. The review of the project documents will alert the inspector to conditions and features of special concern and should identify information the owner or operator should have available at the inspection. With prior notification, the owner or operator can have this information available and be prepared to answer pertinent questions.

4.2 INSPECTOR LIABILITIES

Dam inspectors are responsible for helping the dam owner protect the safety of life and property, so they must possess the expertise and knowledge needed to fully evaluate the dam in question. Failure to discover potential dam safety problems due to a poor inspection could have disastrous results and the inspector could be held liable for such an oversight, especially if the problem should have been detected by an experienced dam safety professional. The dam owner hires a professional inspector to perform a service that will help protect him (the dam owner) from potential financial and legal liabilities resulting from dam failures. Therefore, the dam owner has a reasonable right to expect an accurate and comprehensive report on the condition of the dam, along with recommendations for needed repairs, monitoring, or other follow-up work. An individual should not perform the inspection if he/she is not knowledgeable with the conditions or materials that are present at the dam. It is important that the dam owner use only qualified inspectors, and it is even more important that inspectors do not perform inspections that are beyond their expertise or capabilities.

Inspectors should approach every inspection as though they could be held accountable for any damage that would result from a potential safety problem that they did not discover. On the other hand, it is reasonable to expect that the inspector can not be held accountable for safety problems that could not be observed during the field examination. These problems could include such things as foundation piping that exited in some obscure spot downstream of the dam, embankment problems that occur under water where normal inspections could not detect the problem, or a problem on an embankment that is heavily vegetated and not accessible for inspection. Likewise, an inspector can not be held liable for safety problems that develop after the visual inspection is completed.

It is recommended that inspectors, or their firms, carry professional liability insurance to cover errors of omission, such as problem oversight, or negligence due to incomplete inspection coverage. It is further recommended that the dam owner only hire professionals or firms that carry liability insurance.